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Balan Sundarakani

University of Wollongong in Dubai, balan@uow.edu.au

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DESIGNING A FRAMEWORK AND RESEARCH MODEL FOR THE LOGISTICS SERVICE PROVIDERS INNOVATION AND ADOPTION

Balan Sundarakani

Associate Professor and Program Director
Faculty of Business, University of Wollongong in Dubai
Block 15, Knowledge Village
United Arab Emirates. PO Box 20183
E-mail: balansundarakani@uowdubai.ac.ae

Abstract

This research work is aimed to examine the technological and non-technological innovation adoption mechanism of Logistics Service Providers (LSPs) in the United Arab Emirates (UAE) as the UAE is considered to be one of the fastest emerging markets in the world. By investigating the critical drivers that stimulates LSPs for innovation, growth and sustainability, the research develops various theoretical hypotheses and design a framework that could be used practitioners in the innovation adoption landscape. The proposed methodology follows with the various hypotheses setting, questionnaire design, focus interview, surveying and testing the variables. The research develops an initial framework as well as measures of various factors that drive for technological innovation and adoption in the UAE perspective. The survey results have indicated mixed outcome stating that the lead logistics service providers (15% respondents) have latest technological adoption however majority of them (47% respondents) are still in their nascent stage of technological adoption because of the associated challenges. The research findings can thus be used to promote innovation in the logistics industry by raising the potential to strengthen the competitive advantage of regional logistics industries and also to strengthen the positioning of Dubai as the logistics hub in the Middle East region.

Paper Type: Research paper

Keywords: *Logistics Service Providers Innovation, Innovation adoption; the United Arab Emirates*

Introduction

Innovation mechanism is a complex process that contains many uncertain business scenarios. Furthermore, when compared to innovations in the manufacturing sector, innovations in the service sector, and particularly in the logistics industry, innovations are less formally organized, less technological, and more incremental in nature (Lin (2006)). Some of them tend to be continuous, consisting of numerous small incremental changes which are not considered as innovation individually but become a significant collectively. All these characteristics indicates that studying innovation in the logistics service sector is more challenging as there are fewer precedents to be followed for the forthcoming years. Moreover, innovations in the supply chain are more complicated to study as they often cross firm boundaries though partner relationships and are not easy to identify the path and follow-up.

LITERATURE REVIEW

Innovation in logistics Services

Innovation in logistics services has been defined as "any logistics related service from the basic to the complex that is seen as new and helpful to a particular focal audience. The audience could be internal where innovations improve operational efficiency or external where innovations better serve customers" Flint et al. (2005: 114). According to Lin (2006), logistics innovation can be grouped into two types; Type-1 innovation: technical/technological (stages include data acquisition, information management,

warehousing and transportation) and Type-2 Innovation: administrative and non-technological (activities include; changes in structures, business processes, customer and supplier relationships management and knowledge management issues). Therefore any little improvement in the way of delivering the product, packaging, labeling, warehousing activity, customer service and cost control mechanism etc, provided by the LSPs is considered as the innovation in logistics than the existing way of doing things in logistics industry.

Logistics Sector in the UAE

Geographically, the United Arab Emirates (UAE) is located in the land borders with Oman and Saudi Arabia, it is on the southeastern shores of the Arabian Gulf and western shores of the Gulf of Oman, and it is on the southeast of the Arabian Peninsula. The UAE is one of the six countries that form the Gulf Cooperation Council (GCC) in the Middle East. The UAE is a federation formed by seven different emirates namely: Abu Dhabi, Dubai, Sharjah, Ajman, Umm Al Quwain, Ras Al Khaimah and Fujairah. The UAE has a federal structure composed. The UAE has exploited its potential as a world class logistics hub, with heavy investments in the development of warehousing facilities and transportation infrastructure. A study conducted by Frost and Sullivan (2011) revealed that revenues in the logistics market in 2011 was USD 7.03 billion and is projected to reach USD 9.40 billion in 2014 (Figure 1).

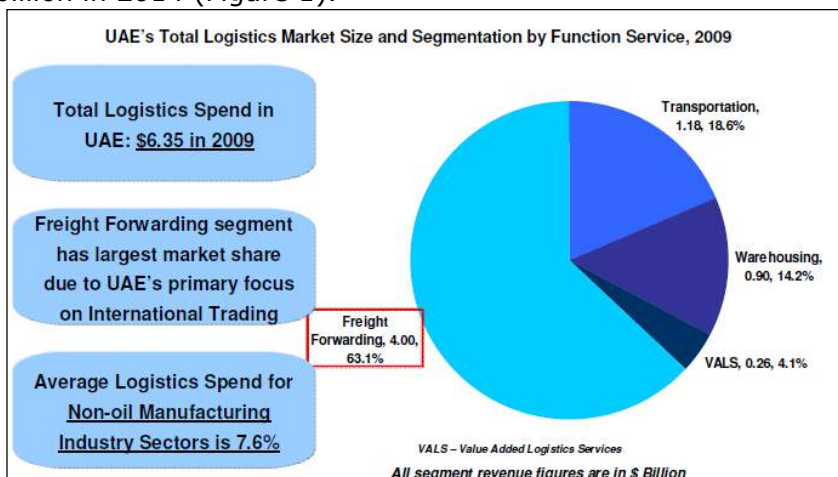


Figure 1. UAE's logistics market; Source: Frost and Sullivan (2011)

The UAE has an advantage over its neighboring countries, as it is a strategic location in terms of a mid-way between the east and the west. Research by Frost & Sullivan shows that a major portion of the logistics revenue i.e. 63.1% has been gained by the freight forwarding segment (an integral part of the 3PL industry) followed by transportation segment with 18.6%. Major portion of the revenue comes from various sectors such as oil and gas, engineering and FMCG industries. This is attributable to international trade activity and large volume of imports from high growth economies such as India and China to name a few. As the UAE manufacturing industries are focused into trade and logistics, the need for freight forwarders and shipping in the logistics sector is high. Through its strategic location, UAE has established itself as a transcontinental center for imports, exports and cross trade.

Need for research

Though there are many prospects for LSPs, the challenges such as labor availability, unskilled workers, heterogeneous in operations and local regulations are yet to be overcome (Transport Intelligence, 2014). Trade corridors can only function if the logistics sector is efficiently regulated. Other challenges faced by LSP's in GCC region could include harmonization of trucking standards, financial incentives for fleet upgrades, sectoral liberalization programs, improving border clearance processes and upgrading border facilities (World Bank, 2015).

Furthermore the literature is limited in dealing with the understanding the LSPs mechanism across borders and its performance in Middle East countries (3PL Study 2012, World Bank, 2010). Major study conducted by Arvis (2010) measured the logistics performance index for selected 150 countries across the world. The Study shows the results of some of the neighborhood countries of UAE and their performance rankings. Singapore is rated as the best country in their study for all indicators in which UAE has been placed in top 20 quartile with the Logistic Performance Index (LPI) score of 3.73 against best score of 4.19 (Singapore). The most interesting thing is that all these GCC countries are ranked within the top 50 out of 150 countries. It also further stimulates us to investigate in depth study of LSP's performance indicators among the companies operating, their innovation and degree of adoption of these process, product and service innovation to their offering in the Middle East region.

Therefore how LSPs are strategically prepared to meet the challenges and innovative enough so as to tab the growing demand of this region in order to provide a sustainable services is really unanswered. This research is an attempt to bridge the gap to examine the current innovation mechanism and its dynamics. An in-depth study of innovation in the logistics service sector therefore requires great effort to follow firms not only in the sector but also their partners. Researchers also may encounter difficulty in finding a sufficient numbers of firms and their partners to participate into the study.

In addition, LSPs innovation relates to multiple stakeholders in the supply chain and their interactions are influenced by various factors. It requires researchers to study the innovation process from multiple angles with various theories in the field of social science, business, and industrial engineering. It needs a strong research support with good understanding of these theories, as well as strong integration ability. The in-depth case study, detailed survey data analysis, and model development and simulation all require a considerable amount of field work in the GCC region.

Research challenge

The study is challenging because the innovation mechanism is complex and complicated with a number of uncertainties. Furthermore, compared to innovations in the manufacturing sector, innovations in the service sector, and particularly in the logistics industry, are less formally organized, less technological, and more incremental in nature. Some of them tend to be continuous, consisting of numerous small incremental changes which are not considered as innovative individually but become significant collectively. All these characteristics make studying innovation in the logistics service sector are more challenging as there are fewer precedents to follow. Moreover, innovations in the supply chain are more difficult to study as they often cross firm boundaries though partner relationships and are not easy to identify and follow-up the path. An in-depth study of innovation in the logistics service sector therefore requires great effort to follow firms not only in the sector but also their partners. Researchers also may encounter difficulty in finding a sufficient numbers of firms and their partners to participate into the study.

THE RESEARCH FRAMEWORK

As a result of globalization, relationship among partners in the logistics and supply chain sector is very complex. Hence, firms needs to collaborate in order to improve the efficiency and responsiveness of their supply chain to allow them to gain competitive advantage over other competing supply chains. A firm can compete by efficiency, differentiation, responsiveness, or a combination of the three by its supply chain (Chopra and Meindl, 2012). For external factors, Fine (2008) studied the impact of industrial environment such as clock speed, institutional pressure, governmental policy, and macroeconomic growth. Literature has shown that the first mover advantage does not exist in some industries such as the disk drive industry (Hamel and Prahalad, 1996). In such an industry, one may explore what are the suitable innovation strategies a firm should take and how to link them with other business strategies. From an infrastructure perspective, Prahalad and Krishnan (2002) highlighted potential impediments from a

sophisticated Information Technology (IT) system to firm innovation, thus questioning the relationship between IT and innovation in the domain of supply chain management. On innovation and firm performance, Hamel and Prahalad (1996) highlighted that the importance of creating a new economy using industry collaboration to gain maximum benefits from innovation. These existing perspectives enable us to assess what are the best commercialization strategies in the service industry in GCC region and how they impact the industry infrastructural issues.

Innovation is becoming a key factor for LSPs to survive and also to thrive in the intense competition. Innovation provides competitive advantage to LSPs (Daugherty et al 1998; Mentzer et al. 2001). Innovation in sustainable logistics becomes another milestone in logistics industry for the end to end service. Innovation in LSPs is a messy process. Franklin (2008) said that "Innovation is often customer driven among LSPs, generalizing it to other customer needs requires lots of reengineering; applying 'Democratized Innovation Model' to LSPs requires modifying the 'end user as innovator' concept". Capitalizing innovation through reactive and channeling approach requires a toolkit based channeling model developing such in-house system made LSPs innovation into a new service called "Lead Logistics Services (LLS)" which can be leveraged to a wide range of customers (Mena et al. 2007). It necessitates for the need of strategic decision making tool to address the emerging constraints because these constraints often act as a driver for new models in innovation. On the other hand, managing this requires an integrated, more flexible, agile framework to meet the organizational clock speed (Flint et al. 2008). In the proposed project, the research develops an integrated approach consisting of traditional and modern (democratized innovator) innovative strategy in the LSPs landscape as a conceptual framework depicted in Figure 2.

On innovation and firm performance, Christensen et al. (2004) highlighted the importance of matching new product commercialization with the industry condition for maximum benefits from innovation. Grawe (2009) carried out a literature review on logistics innovation and drawn a conceptual framework for LSPs. However the study does not address the socio-economic dimension and its impact. The framework can be extended to fit into the regional context of the logistics service industry and also to find suitable exploitation strategies to diffuse some promising innovations via roadmaps and scenario analyses. The core of the framework (adapted from TLIAP, 2015) is the internal innovation process that takes place within one or sometimes even several companies. Actual innovation is produced only upon the completion of the last stage of this process. An invention first needs to be created, followed by its actual implementation and often adoption.

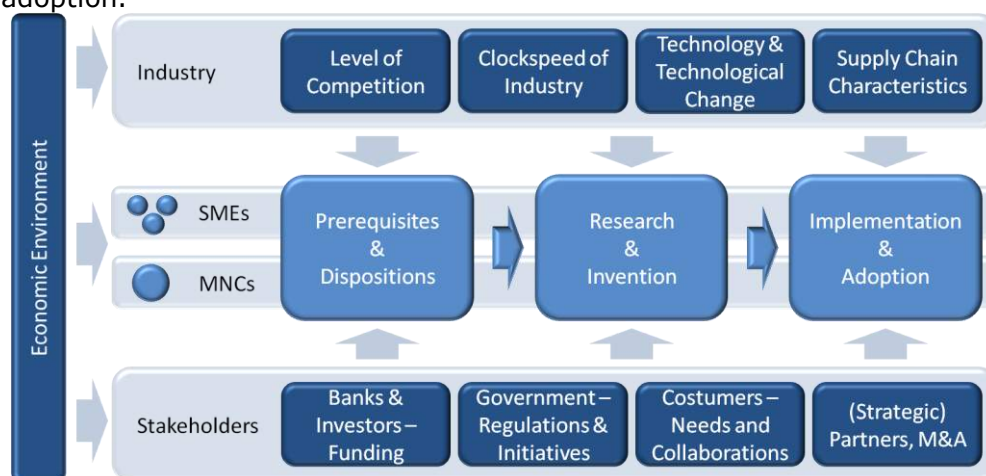


Figure 2: A conceptual framework of the innovation process and the influencing factors in logistics services, Source: The Logistics Institute Asia Pacific (2015)

The development of an innovation is a sequential process that involves three steps: from setting the ground ('Prerequisites & Dispositions') to creating ideas and inventions ('Research & Inventions') to the implementation ('Implementation & Adoption').

Characteristics of this process vary heavily depending on the size of companies and are therefore mirrored by the distinction between small-to-medium enterprises (SMEs) and multinational corporations (MNCs), as well as by the possible interactions between different logistics service providers.

All steps of this process are influenced by external factors that come from the LSPs and specific stakeholders and each of these factors can influence the innovation process at each of its three stages in very different ways. This process is similar to how the clock-speed of a certain industry sets the pace for its growth, maturity and decline in product life cycle. Investors play a crucial role in providing a suitable environment that fosters the innovation process at all the three stages. Furthermore, the current global financial crisis prevents investors and banks from facilitating this process, governmental initiatives may also choose to participate in providing knowledge or funding of different stages of the innovation process.

The Research Question

From the literature review across the various issues driving the innovation mechanism of LSPs, the following research question is generated;

“How innovative are the logistics service providers during the era of global financial crisis in order to provide a sustainable logistics services?”

This research question will lead to influencing theories in the area of logistics innovation and its dynamics under the challenging assumptions drawn in the earlier section of the literature.

The Research Objective

The proposed research question can be addressed by the following objectives:

- Extending the literature review in order to develop an initial framework, as well as measures of various factors that drive for product, process and service level innovation
- Design hypotheses to those identified internal and external drivers of innovation model
- Conducting multiple case studies on the innovation mechanism of a few careful selected LSPs asking “How” and “Why” questions pertaining to innovation
- Performing a questionnaire based survey to gain a broad understanding of innovation mechanisms in the LSP’s in order to validate our frameworks

THE RESEARCH METHODOLOGY

The proposed methodology follows five streams namely; hypotheses setting, questionnaire design, focus interview, surveying and testing the variables. The methodology is a mixed/hybrid approach combining the qualitative research (inductive type comprising of hypothesis setting, questionnaire design & focus interview) and quantitative research. The research develops an initial framework as well as measures of various factors that drive for technological innovation and adoption in the UAE perspective.

The hypothesis setting

The research extends the framework highlighted in the earlier section based on variables identified from literature review to derive the hypotheses and to understand the LSPs innovation and its adoption in the region (see Figure 2). Degree of the hypothesis setting and measurement details are based on the conceptual framework. Based on the model displayed in figure 2, this research proposes the below 9 hypotheses.

Hypothesis 1: Technological changes drive positively the LSPs internal innovation

Hypothesis 2: Organisational collaboration and competition drive positively the LSPs internal innovation

Hypothesis 3: Innovation in business process and service drive positively the LSPs internal innovation

Hypothesis 4: Government regulation drives positive external pressure to the LSPs innovation

- Hypothesis 5: Investment climate drives positive external pressure to the LSPs innovation
- Hypothesis 6: Customer expectation drives positive external pressure to the LSPs innovation
- Hypothesis 7: Firms internal pressures is positively associated with LSPs innovation angle
- Hypothesis 8: Firms external pressures is positively associated with LSPs innovation mechanism
- Hypothesis 9a: The age is positively associated with the LSPs innovation adoption
- Hypothesis 9b: The firm size is positively associated positively associated with the LSPs innovation adoption
- Hypothesis 9c: The firm type is positively associated positively associated with the LSPs innovation adoption

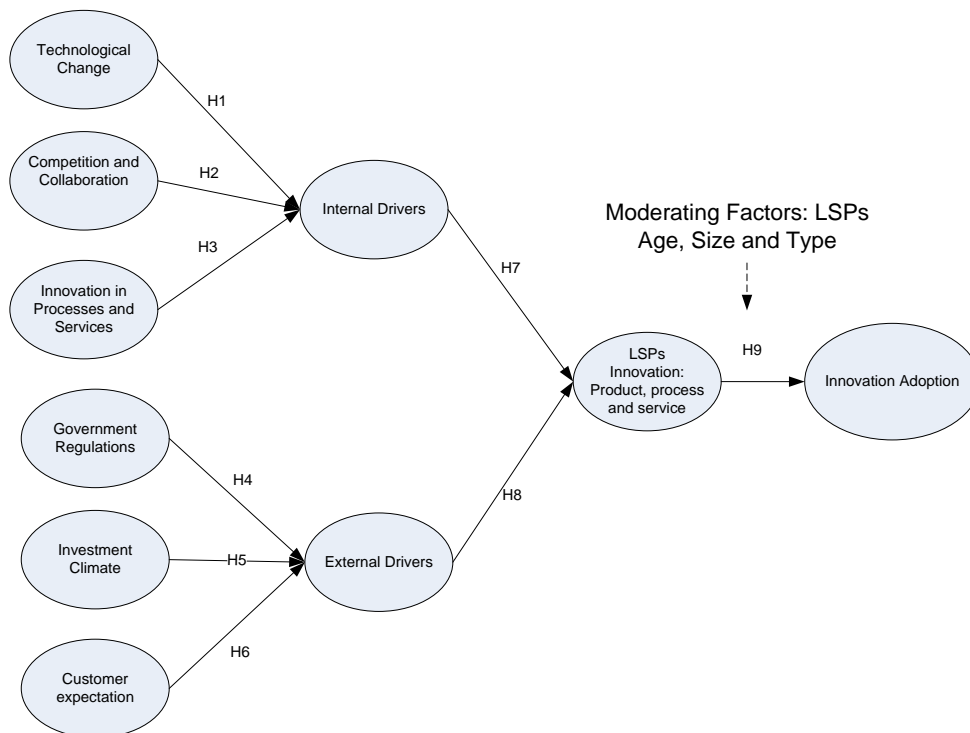


Figure 2. Illustration of the proposed research model with Hypotheses (H1-H9)

Questionnaire design

The Questionnaire survey consists of four main sections: organizational information, company strategies and directions, process improvements and the adoption of emerging technology in the future. Understanding the organizational information enables us to understand the company profile, of their supplier and customer, and distribution of employees with the support of logistics and information technology. Similarly, knowing the company strategies and directions will help to understand their company priorities in pursuit of supply chain management and also to identify whether these priorities are in line with best practices in the world.

Focus Interview

The focus interview provides exceptionally valuable opportunities to gather further pertinent information and perspectives from a wide range of professionals who have knowledge about the LSPs sector and these special topics. The research is aimed to meet five selective industries from each emirate within the UAE to observe its trends and innovation characteristics, which are used for model validation and triangulation.

Surveying

An online survey is hosted through survey monkey and email invitations ailed to 300 (sample size) companies from logistics industries, oil & gas, electronics, telecommunications, food and beverages, chemical, port, customs and other logistics related organizations. The respondents are requested to respond using a five-point Likert scale for most of the questions. The model are tested against the obtained measurement data to determine how well the model fits the data. The results are then triangulated against measured data and real-time scenarios. Techniques like questionnaire design, surveying and spss analysis have been used in different context in different sophisticated application successfully. However combination of these five streams in the context of Innovation dynamics in LSPs context is not yet attempted by any researchers. Moreover, investigating the innovation mechanism of LSPs in this part of world is very new effort and has a great potential for theory building.

An in-depth understanding of regional logistics innovation mechanism would help to identify the most inductive environment for supply chain innovation in the logistics industry, as well as helps to determine the most promising drivers in current logistics services. The research findings can thus be used to promote innovation in the logistics industry by raising the potential to strengthen the competitive advantage of regional logistics industries and also to strengthen the positioning of Dubai as the logistics hub of the GCC region as well as the surrounded logistics hubs such as Bahrain, Kuwait, Muscat and Riyadh.

Major Findings

The survey results have indicated mixed outcome stating that the lead logistics service providers (15% respondents) have latest technological adoption however majority of them (47% respondents) are still in their nascent stage of technological adoption because of the associated challenges. The research findings can thus be used to promote innovation in the logistics industry by raising the potential to strengthen the competitive advantage of regional logistics industries and also to strengthen the positioning of Dubai as the logistics hub in the Middle East region.

Research limitations/implications

The research is therefore limited to the UAE region. Further, an in-depth understanding of regional logistics innovation mechanism would help to identify the most inductive environment for supply chain innovation in the logistics industry, as well as helps to determine the most promising drivers in current logistics services. Theoretically, LSPs innovation relates to multiple stakeholders in the logistics and their interactions are influenced by various factors. It requires researchers to study the innovation process from multiple angles with various theories in the field of logistics. It needs a strong professional research team with good understanding of these theories, as well as strong integration ability. The in-depth case study, detailed survey data analysis, and model development and simulation all require a good understanding of the grounded theories and research expertise in the proposed area.

CONCLUSION

The research will create useful practical implications for managers which would be one of its first kinds of this region across GCC. In addition, this work will be the new innovative idea in this globalized world which can be used by various logistics industries, governments and public sectors for their operations. Uniqueness of this approach, survey findings and novelty of this proposed structural model will have better chances of succeeding in the current GFC scenario where, innovation is going to play an increasing significant importance in the way LSP's operate.

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